

oxide regions or mesa structures) in several semiconductor materials systems. However, **the present hypothesis is distinctly different (because the SiGe is engulfed in a crystalline material)**"

The Examiner's reference to col. 4, ln. 16-19 of Selvakumar appears to refer to an interface between silicon-dioxide and a SiGe *channel*. The text does not specifically refer to an interface with a region of SiGe. It appears that Selvakumar has defined the SiGe *channel* to include the broader category of a small SiGe region engulfed in silicon. The SiGe *channel* will therefore have an interface with silicon-dioxide, even though the actual SiGe is separated from the silicon-dioxide by a layer of silicon as explicitly outlined in col. 5, ln. 32-42 excerpted above.

Figures 5-7, as referenced by the Examiner, indicate a "Ge implant area 8" (col.3, ln. 47). Again, this text does not specifically refer to the SiGe region. The implant area 8 appears to be more broadly defined to include a small SiGe region engulfed in silicon. The explicit text of col. 5, ln. 32-42 appears to be the most accurate discussion in Selvakumar with respect to the interfaces involved.

The SiGe region of Selvakumar therefore is adjoined to a silicon region which in turn is adjoined to a SiO<sub>2</sub> gate oxide. Selvakumar does not show a Si<sub>1-x</sub>Ge<sub>x</sub> channel region, having a germanium molar fraction x, located underneath the SiO<sub>2</sub> gate oxide and between the source/drain regions, wherein x is less than or equal to 0.6, and **wherein the Si<sub>1-x</sub>Ge<sub>x</sub> channel region forms a Si<sub>1-x</sub>Ge<sub>x</sub>/SiO<sub>2</sub> gate oxide interface.**

In contrast, all independent claims of Applicant's invention include a Si<sub>1-x</sub>Ge<sub>x</sub> channel region, having a germanium molar fraction x, located underneath the SiO<sub>2</sub> gate oxide and between the source/drain regions, wherein x is less than or equal to 0.6, and **wherein the Si<sub>1-x</sub>Ge<sub>x</sub> channel region forms a Si<sub>1-x</sub>Ge<sub>x</sub>/SiO<sub>2</sub> gate oxide interface.** Applicant notes the importance of Applicant's novel implantation process through the gate oxide that allows the formation of a device including a Si<sub>1-x</sub>Ge<sub>x</sub>/SiO<sub>2</sub> gate oxide interface.

Because Selvakumar does not show the Si<sub>1-x</sub>Ge<sub>x</sub> channel region described above, and in fact teaches away from Applicant's channel region, a 35 USC § 102(b) is not supported by Selvakumar. Reconsideration and withdrawal of Examiner's 35 USC § 102(b) rejection is therefore respectfully requested with respect to independent claims 11, 24, 25, 28, 38, 40, and 41 and all claims that depend therefrom.

**§103 Rejection of the Claims**

Claims 13, 26, 27, 39, 42, and 43 were rejected under 35 USC § 103(a) as being unpatentable over Selvakumar et al. (U.S. Patent No. 5,426,069) together with Crabbe' et al (U.S. Patent No. 5,821,577).

Crabbe appears to show a transistor containing a silicon germanium channel 18. However, the silicon germanium layer in Crabbe is "sandwiched between layers of pure silicon" (Col. 4, ln. 45-48). As further discussed in col. 6, ln. 22-28, a silicon cap layer 20 is deposited on the SiGe channel layer 18, and a gate insulator layer 22 is formed on the cap layer 20. Crabbe does not show or suggest a  $\text{Si}_{1-x}\text{Ge}_x$  channel region, having a germanium molar fraction  $x$ , located underneath the  $\text{SiO}_2$  gate oxide and between the source/drain regions, wherein  $x$  is less than or equal to 0.6, and **wherein the  $\text{Si}_{1-x}\text{Ge}_x$  channel region forms a  $\text{Si}_{1-x}\text{Ge}_x/\text{SiO}_2$  gate oxide interface.**

In contrast, all independent claims of Applicant's invention include a  $\text{Si}_{1-x}\text{Ge}_x$  channel region, having a germanium molar fraction  $x$ , located underneath the  $\text{SiO}_2$  gate oxide and between the source/drain regions, wherein  $x$  is less than or equal to 0.6, and **wherein the  $\text{Si}_{1-x}\text{Ge}_x$  channel region forms a  $\text{Si}_{1-x}\text{Ge}_x/\text{SiO}_2$  gate oxide interface.**

Because Crabbe fails to cure the deficiencies of Selvakumar, a 35 USC § 103 is not supported by the listed references. Reconsideration and withdrawal of Examiner's 35 USC § 103(a) rejection is therefore respectfully requested with respect to claims 13, 26, 27, 39, 42, and 43.

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**CONCLUSION**

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6944 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 7 day of September, 2001.

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